

HP StorageWorks Cache LUN XP user's guide

XP48
XP256
XP512

fifth edition (May 2004)

part number: B9345-96002

This guide explains how to install and use the Cache LUN XP application



© Copyright 2000-2004, Hewlett-Packard Development Company, L.P. All rights reserved.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice.

All product names mentioned herein may be trademarks of their respective companies.

Hewlett-Packard Company shall not be liable for technical or editorial errors or omissions contained herein. The information is provided "as is" without warranty of any kind and is subject to change without notice. The warranties for Hewlett-Packard Company products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Printed in the U.S.A.

HP StorageWorks Cache LUN XP: User's Guide

fourth edition (May 2004)
part number: B9345-96002

Contents

About this guide	3
Intended audience	3
Related documentation	3
Conventions	4
Getting help	4
HP technical support	5
HP storage web site	5
HP authorized reseller	5
Revision history	6
Warranty statement	7
1 Introduction	9
Cache extents	10
Modified volume types	10
Modes	11
Prestaging (XP256 only)	12
Logical blocks	13
Supported emulation types	14
Restrictions	14
2 Installation	17
System requirements	18
Installing	19
Uninstalling	22
3 Operation	23
Starting operations	24
Placing data in cache	27
Removing data from cache	31

4 Troubleshooting 35

Glossary 37

Index 41

About this guide

This manual describes the requirements, installation, and procedures for the Cache LUN software product.

Intended audience

This guide is intended for use by system administrators who already have expertise with the associated systems and software and knowledge of related topics:

- Data processing concepts
- Direct-access storage device subsystems and their basic functions
- Disk arrays and RAID technology
- Operating system commands and utilities

Related documentation

HP provides the following related documentation:

- *HP StorageWorks Disk Array XP48: User's Guide*
- *HP StorageWorks Disk Array XP256: User's Guide*
- *HP StorageWorks Disk Array XP512 User's Guide*
- *HP StorageWorks Remote Control XP: User's Guide.*
- *HP StorageWorks LUN Configuration Manager XP: User's Guide.*

For information about operating system commands and third-party products, refer to the manufacturer's documentation.

Conventions

This guide uses the following text conventions.

page 1	Blue text represents a cross-reference. For the online version of this guide, the reference is linked to the target.
www.hp.com	Underlined, blue text represents a website on the Internet. For the online version of this guide, the reference is linked to the target.
literal	Bold text represents literal values that you type exactly as shown, as well as key and field names, menu items, buttons, file names, application names, and dialog box titles.
<i>variable</i>	Italics indicates that you must supply a value. Italics is also used for manual titles.
input/output	Monospace font denotes user input and system responses, such as output and messages.
<i>Example</i>	Denotes an example of input or output. The display shown in this guide may not match your configuration exactly.
[]	Indicates an optional parameter.
{ }	Indicates that you must specify at least one of the listed options.
	Separates alternatives in a list of options.

Getting help

If you still have questions after reading this guide, contact an HP authorized service provider or access our website:

www.hp.com

HP technical support

In North America, call technical support at 1-800-652-6672. Technical support is available 24 hours a day, 7 days a week.

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website under support:

thenew.hp.com/country/us/eng/support.html

Be sure to have the following information available before calling:

- technical support registration number (if applicable)
- product serial numbers
- product model names and numbers
- applicable error messages
- operating system type and revision level
- detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP storage web site

The HP web site has the latest information on this product, as well as the latest drivers. Select the appropriate product or solution from this web site:

thenew.hp.com/country/us/eng/prodserv/storage.html

HP authorized reseller

For the name of your nearest HP authorized reseller, you can obtain information by telephone:

United States 1-800-345-1518

Canada 1-800-263-5868

elsewhere See the HP website for locations and telephone numbers:

www.hp.com

Revision history

August 2000	First release.
May 2004	Updated to add support for OPEN-E, OPEN-L, and OPEN-M.

Warranty statement

HP warrants that for a period of ninety calendar days from the date of purchase, as evidenced by a copy of the invoice, the media on which the Software is furnished (if any) will be free of defects in materials and workmanship under normal use.

DISCLAIMER. EXCEPT FOR THE FOREGOING AND TO THE EXTENT ALLOWED BY LOCAL LAW, THIS SOFTWARE IS PROVIDED TO YOU “AS IS” WITHOUT WARRANTIES OF ANY KIND, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. HP SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, NON-INFRINGEMENT, TITLE, ACCURACY OF INFORMATIONAL CONTENT, AND FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow exclusions of implied warranties or conditions, so the above exclusion may not apply to you to the extent prohibited by such local laws. You may have other rights that vary from country to country, state to state, or province to province.

WARNING! YOU EXPRESSLY ACKNOWLEDGE AND AGREE THAT USE OF THE SOFTWARE IS AT YOUR SOLE RISK. HP DOES NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE SOFTWARE WILL MEET YOUR REQUIREMENTS, OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED, VIRUS-FREE OR ERROR-FREE, OR THAT DEFECTS IN THE SOFTWARE WILL BE CORRECTED. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE OF THE SOFTWARE IS ASSUMED BY YOU. HP DOES NOT WARRANT OR MAKE ANY REPRESENTATIONS REGARDING THE USE OR THE RESULTS OF THE USE OF THE SOFTWARE OR RELATED DOCUMENTATION IN TERMS OF THEIR CORRECTNESS, ACCURACY, RELIABILITY, CURRENTNESS, OR OTHERWISE. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY HP OR HP’S AUTHORIZED REPRESENTATIVES SHALL CREATE A WARRANTY.

LIMITATION OF LIABILITY. EXCEPT TO THE EXTENT PROHIBITED BY LOCAL LAW, IN NO EVENT INCLUDING NEGLIGENCE WILL HP OR ITS SUBSIDIARIES, AFFILIATES, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS OR SUPPLIERS BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR OTHER DAMAGES (INCLUDING LOST PROFIT, LOST DATA, OR DOWNTIME COSTS), ARISING OUT OF THE USE, INABILITY TO USE, OR THE RESULTS OF USE OF THE SOFTWARE, WHETHER BASED IN WARRANTY, CONTRACT, TORT OR OTHER LEGAL THEORY, AND WHETHER OR NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Your use of the Software is entirely at your own risk. Should the Software prove defective, you assume the entire cost of all service, repair or correction. Some jurisdictions do not allow the exclusion or limitation of liability for incidental or consequential damages, so the above limitation may not apply to you to the extent prohibited by such local laws.

NOTE. EXCEPT TO THE EXTENT ALLOWED BY LOCAL LAW, THESE WARRANTY TERMS DO NOT EXCLUDE, RESTRICT OR MODIFY, AND ARE IN ADDITION TO, THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE LICENSE OF THE SOFTWARE TO YOU; PROVIDED, HOWEVER, THAT THE CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS SPECIFICALLY DISCLAIMED AND SHALL NOT GOVERN OR APPLY TO THE SOFTWARE PROVIDED IN CONNECTION WITH THIS WARRANTY STATEMENT.

Introduction

HP StorageWorks Cache LUN XP is an optional product that runs under HP StorageWorks Remote Control XP.

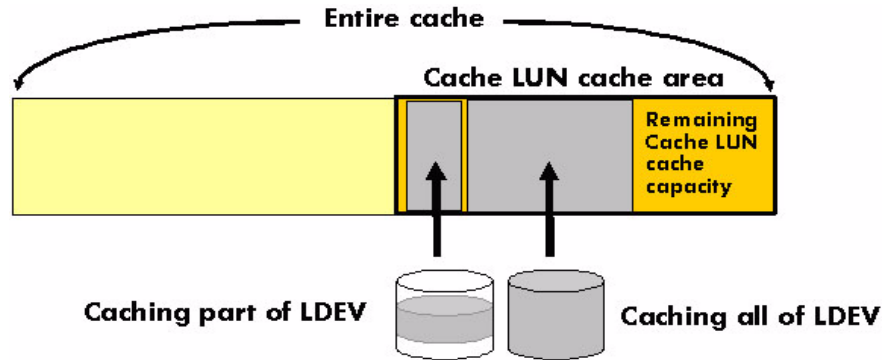
Cache LUN lets you reserve areas of cache memory on the array for storing high-use data from the LDEVs. This capability improves data access speed because the cache-resident data is available to the hosts at much faster transfer speeds. This can be applied to both read and write I/O operations.

Cache LUN works with normal volumes, LUSE volumes, and custom (VSC) volumes.

When you use VSC volumes and Cache LUN together, you can achieve higher data access performance than when these features are used separately.

Cache LUN requires a portion of cache memory, called the “Cache LUN cache area.” You can change the capacity of the Cache LUN cache area when installing or removing cache memory.

Typically, data assigned to Cache LUN becomes resident (“staged”) in cache after it is first accessed by the host. Then, the host finds the data in cache for the second and subsequent accesses.



Cache extents

You can add or remove cache areas (called cache extents) at any time. A Cache LUN cache extent is a range of logical blocks of 512 bytes each within an LDEV. The range of a cache extent is defined by its starting and ending LBAs (logical block addresses). You can increase the cache extent size in increments of one logical block. The maximum size for a cache extent depends on the type of LDEV. You can have a maximum of 1024 cache extents.

Data assigned to a cache extent is not read into cache until referenced. The first read to a block will result in a cache “miss,” triggering the initial staging of the data into cache from disk. Subsequent reads to that block will result in cache “hits.” The XP256 has the ability to preload cache prior to the first hit. (See “Prestaging (XP256 only)” on [page 12](#).)

It is very difficult for an application to determine which portion of a LUN has been assigned to a Cache LUN extent. For this reason, it is recommended that the entire volume be placed into an extent.

Modified volume types

LUSE (LU Size Expansion) and VSC volumes can be placed in the Cache LUN cache area. If you want to apply Cache LUN to an LUSE volume, you must apply Cache LUN to all the LDEVs that form the LUSE volume.

Modes

Cache LUN XP has two modes you can set for each extent: priority mode and bind mode. All write I/Os to cache LUN extents result in duplex writes for increased fault tolerance. This duplex writing is the same as with non-cache LUN data.

Priority mode

Priority mode requires fewer cache resources but has performance limitations over bind mode. Priority mode keeps all read data in cache (until you delete the extent) but all writes are destaged to disk normally (using the same algorithms as for regular, non-Cache LUN data).

- All reads following the initial read to a block will result in 100% cache hits.
- After destaging the write block to disk, the duplicated write areas in general cache become free.
- While destaging to disk, read requests to the same block are delayed until the disk operation is completed.
- Priority mode generates write traffic to disk, while bind mode does not.

In addition to the Cache LUN cache, you should set the general cache capacity according to the number of areas set in priority mode. This prevents a reduction in general cache performance.

If the general cache is overloaded (having very little cache space), it will be exhausted, often resulting in a wait for free cache space. This may degrade access to the general cache.

- If you set up to 512 areas in Cache LUN, set 512 MB x 2 (1024 MB) of standard cache.
- If you set 513-1024 areas in Cache LUN, set 1024 MB x 2 (2048 MB) of standard cache.

Bind mode

Bind mode keeps both read and write data in cache, eliminating disk traffic (100% read/write hits). All data stays in cache until the extent is removed. The data stored in the Cache LUN cache is duplexed for data protection, and this requires additional Cache LUN cache capacity. If there is a loss of AC power, data is maintained in cache for up to 48 hours, using battery power.

- All reads following the initial read to a block will result in cache hits.
- Duplicated write blocks are stored in cache and are never “evicted.”
- All read or write blocks stay resident in cache until the extent is deleted.
- Bind mode requires more cache because duplicated write blocks are not destaged to disk.

For RAID-5 parity groups, a Cache LUN extent in bind mode requires a cache capacity three times larger than the user data.

For RAID-1 parity groups, a Cache LUN extent in bind mode requires a cache capacity twice as large as user data.

If you want to change a RAID-1 or RAID-5 parity group’s mode from priority mode to bind mode, reset and reallocate the affected Cache LUN extent. When you reallocate, specify the greater capacity needed for bind mode.

Prestaging (XP256 only)

For XP256, Cache LUN allows you to prestage the data into cache before the host accesses it. When prestaging is enabled, it may affect performance for a short time while reading the data into Cache LUN cache.

When prestaging is not used, the data is loaded into the Cache LUN extents when the first cache “miss” occurs.

Caution *If the cache becomes overloaded during prestaging, there may be degradation in performance. Prestaging requests should not be performed during periods of peak activity. Additional prestaging requests will not be accepted during prestaging execution.*

Logical blocks

Cache extents must be defined in logical blocks using logical block addresses (LBAs), with a minimum size of 96 LBAs. However, it is most likely that you will assign an entire open system volume to Cache LUN.

For example, to define a cache extent of one logical block, you can use a starting LBA of 0 and an ending LBA of 95, or a starting LBA of 480 and an ending LBA of 575. The starting and ending LBAs must be in increments of 96. If you enter the LBAs in increments less than 96, Cache LUN automatically corrects this for you.

For another example, to define a cache extent of two logical blocks, you can use a starting LBA of 0 and an ending LBA of 191 or a starting LBA of 192 and an ending LBA of 383.

The table below shows the maximum LBA range for each emulation type.

Emulation Type	Starting LBA	Ending LBA
OPEN-K	0	3661919
OPEN-3	0	4806719
OPEN-8	0	14351039
OPEN-9	0	14423039
OPEN-E	0	28452959
OPEN-L	0	71192159
OPEN-M	0	92158559

Supported emulation types

Supported emulation types are OPEN-x (x = K, 3, 8, 9, E, L, M).

Restrictions

Configuration restrictions

- Do not exceed the capacity of the Cache LUN cache.
- Do not configure an Auto LUN reserved volume for Cache LUN.
- Do not place an LDEV in cache twice.
- You cannot allocate Cache LUN cache space for an on-demand LDEV.
- To apply Cache LUN to LUSE volumes, you must apply it to all the LDEVs that form the LUSE volumes.

Usage restrictions

If an LDEV is placed in cache, you must not use it for BC/CA quick restore operations or Auto LUN migration. These operations may swap the internal locations of the primary and secondary volumes and cause a loss of data integrity.

Because standard volumes are quite large, you should consider creating smaller custom volumes for use with Cache LUN. Custom size volumes are created by partitioning standard LDEVs using the VSC function of HP StorageWorks LUN Configuration Manager XP.

You cannot change a Cache LUN extent after it is configured. To change the specification, you must reset (“release”) the Cache LUN extent, and then reallocate (“set”) the Cache LUN extent.

VSC automatic resets

In the following cases, a Cache LUN cache extent is deleted (“reset” or “released”) automatically:

- If an FV (Fixed Volume), part or all of which is assigned to Cache LUN, is converted into free space by the VSC Volume to Space function.
- If a CV (Customized Volume), part or all of which is assigned to Cache LUN, is converted into free space by the VSC Volume to Space function.
- If an LDEV (or VDEV) containing FVs and CVs assigned to Cache LUN is initialized by the VSC Volume Initialize function.

2

Installation

This chapter describes how to install and uninstall Cache LUN XP.

System requirements

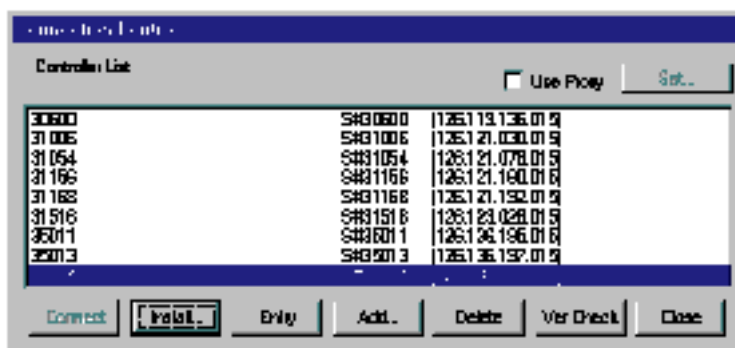
The system requirements for installing Cache LUN XP are:

- HP StorageWorks disk array
- HP StorageWorks Remote Control XP (RC) installed on the remote console PC
- *(Recommended)* HP StorageWorks LUN Configuration Manager XP installed on the remote console PC
- Cache LUN firmware option. Your HP service representative must install the Cache LUN firmware option on the disk array before you install the software license key. For more information about installing option firmware keys, see the Remote Control XP documentation
- Cache LUN XP software license key
- Enough cache memory to accommodate the volumes you wish to cache. Your HP representative can help you determine how much to install
- Administrator access to perform Cache LUN operations

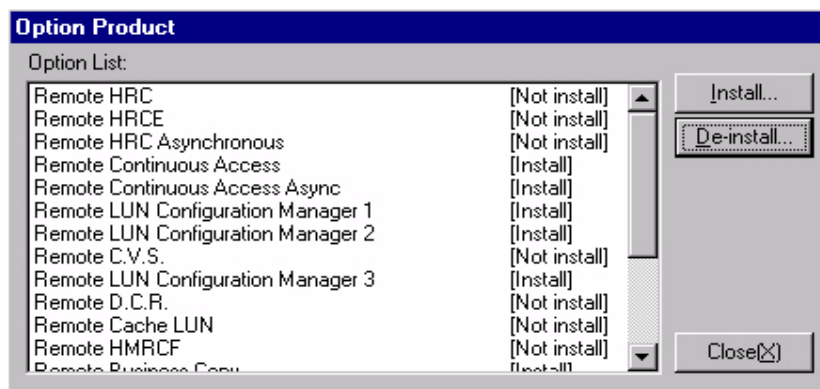
Installing

Your HP representative initially installs the Cache LUN license keys for the options you have purchased. You then install the corresponding remote license keys from the remote console PC.

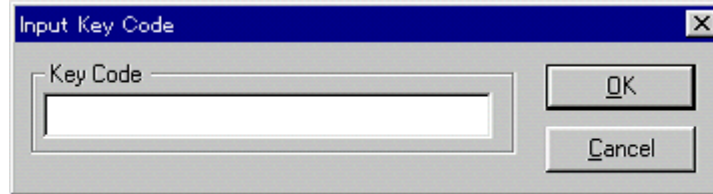
1. Log in to Remote Control XP as an administrator.
2. On the RC main window, click **Controller**. A list of disk arrays is displayed.



3. Select the disk array for which you want to install the key, and click **Install**. The Option Product window opens. This window shows the current installation status of RC options.

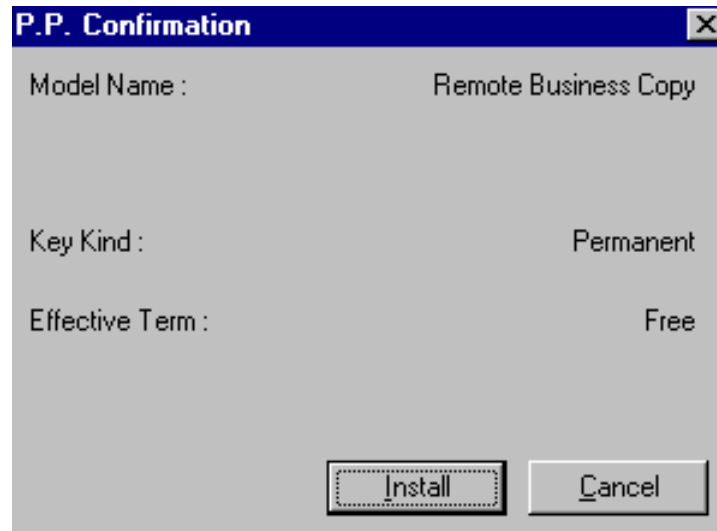


4. Select the **Remote Cache LUN** option from the option list.
5. Click **Install**. The Input Key Code window opens.



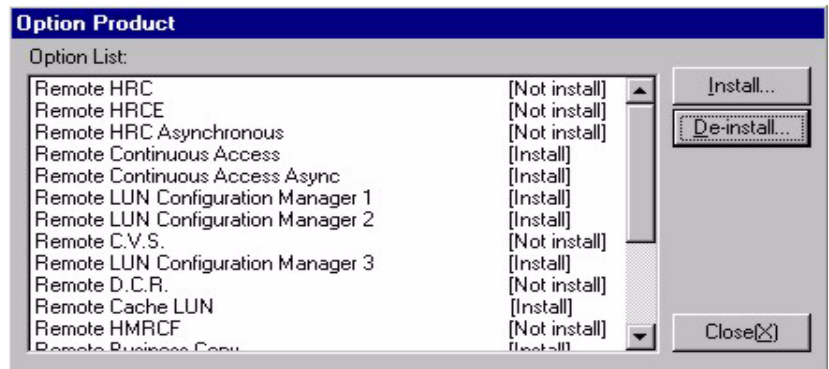
6. Enter the license key in the Key Code text box.
7. Click **OK**.

If the password is approved, the Program Product (P. P.) Confirmation window opens, showing the product name, model name, key kind, and effective term.



8. Verify the content of the Program Product window and click **Install**.

When the Cache LUN option installation is complete, the Option Product window opens, and the displayed status of the Cache LUN option changes from Not install to Install.

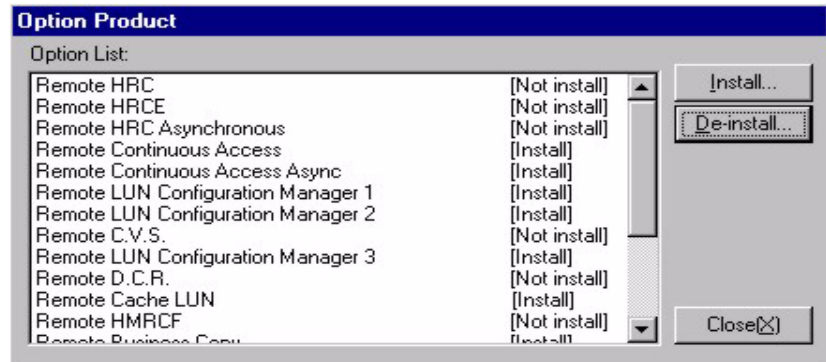


If your key code is not accepted, verify that the key code is for Cache LUN and that you have entered the key code correctly. If you entered the key code correctly, contact your HP service representative.

9. Click **Close** to return to the RC main window.

Uninstalling

1. Log in to Remote Control XP as an administrator. The RC main window opens.
2. Click **Option**. The Option Product window opens, showing the current installation status of the RC options.



3. Select the **Remote Cache LUN** option from the option list.
4. Click **De-install**. The Option Product window changes the status of Remote Cache LUN from Install to Not install. Cache LUN is now uninstalled.
5. Click **Close** to return to the RC main window.

Operation

Cache LUN XP enables you to change the caching configuration of the disk array.

Cache operations can be performed by users with administrator or customized access privileges. Other users can only view the cache configuration information for the disk array.

Starting operations

Access Cache LUN through Remote Control (RC).

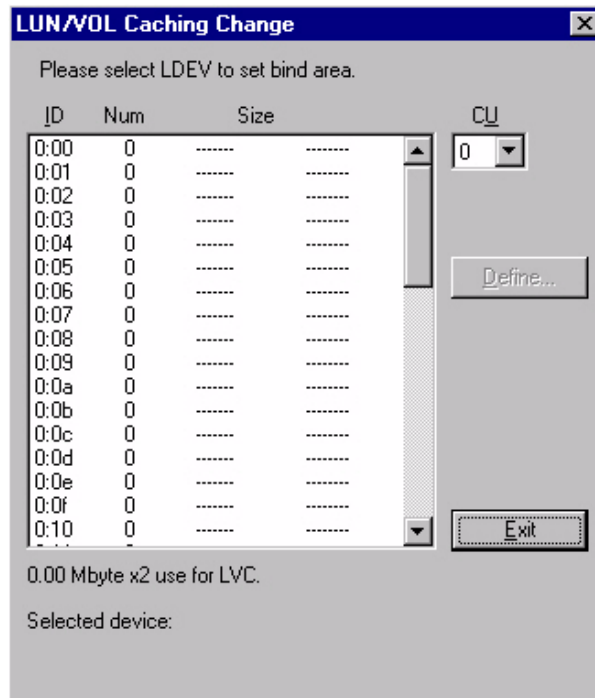
To start Cache LUN operations:

- 1. Start and log in to RC.
- 2. Connect to the disk array. The RC option select window opens.



- 3. Select LUN/VOL Caching. The remote console PC now loads the disk array cache configuration information.

This process can take several minutes before the LUN/VOL Caching Change window opens.



The LUN/Caching Change window displays the following:

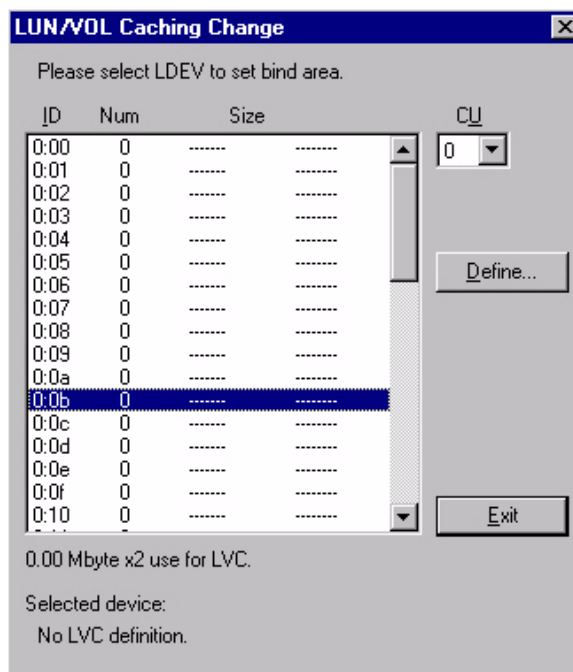
- LDEV list box** Displays the existing configuration of each LDEV in the selected CU.
- ID column** The LDEV ID.
- Num column** The number of Cache LUN cache extents.
- Size column** The number of logical blocks for each LDEV. The total amount of reserved Cache LUN cache for the selected LDEV is displayed below the LDEV list box.
- CU selection box** Allows you to select the desired CU. The information in the LDEV ID list box is updated when you select a different CU.

Define button	Opens the LUN/VOL Caching Detail window for the selected LDEV.
Exit button	Exits Cache LUN and returns you to the option select window. Cache LUN changes are not implemented until after you click Exit on the LUN/VOL Caching Change window.

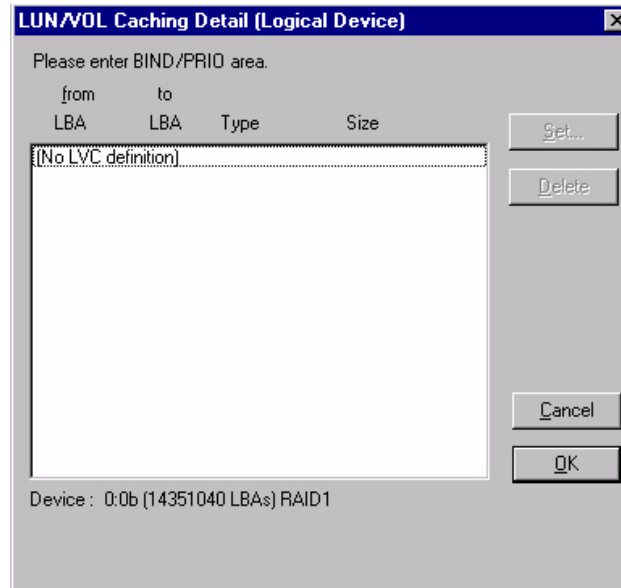
Placing data in cache

The operation does not complete until you click **Exit** on the LUN/VOL Caching Change window at the end of the procedure.

1. From the LUN/VOL Caching Change window, select the appropriate CU, select the desired volume, and click **Define**.

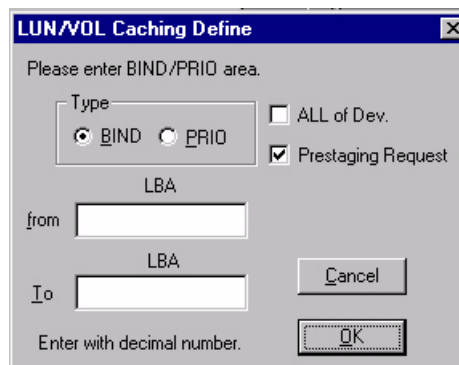


The LUN/VOL Caching Detail (Logical Device) window now opens. The LUN/VOL Caching Detail (Logical Device) window displays the current Cache LUN configuration of the selected LDEV and the number of remaining logical blocks that can be placed in bind-mode and priority-mode cache.



2. Click **Set**.

The LUN/VOL Caching Define window opens (XP256 shown).



3. On the LUN/VOL Caching Define window, click the cache mode type (**BIND** or **PRIO**).
4. Enter the starting LBA (logical block address) number in the **from LBA** field and enter the ending LBA number in the **to LBA** field.

If you want to include all LBAs in the device, check the ALL of Dev box.

5. (*XP256 only*) If you want to disable prestaging, select the **Prestaging Request** check box so that the check mark is removed.
6. Click **OK** to continue.

The LUN/VOL Caching Detail (Logical Device) window now displays the cache configuration of the selected LDEV.

Please enter BIND/PRIO area.

from LBA	to LBA	Type	Size
0	92159	BIND+	92160 LBAs

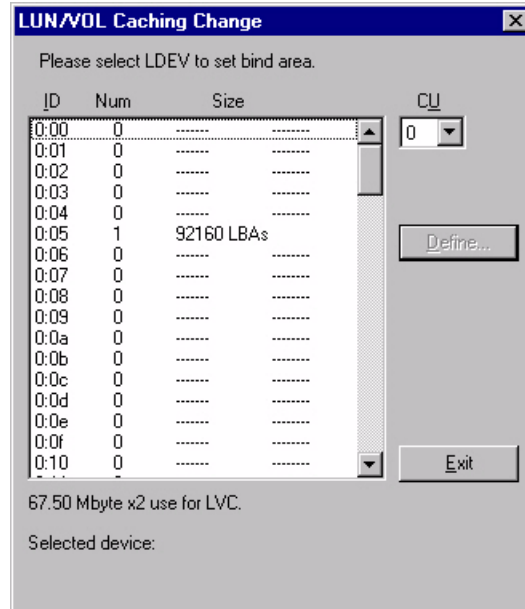
Set..
Delete
Cancel
OK

Device : 0:05 (4806720 LBAs) RAID5
606816 LBAs remain for BIND
1820640 LBAs remain for PRIO
+:Prestaging area

7. If the information is not correct, select the incorrect Cache LUN setting, click **Delete**, and repeat steps 3 through 6 to re-enter the information.

8. If the information is correct, click **OK** to continue.

The LUN/VOL Caching Change window now displays the new cache configuration for the selected LDEV.



9. To create cache data extents for another volume, repeat steps 1 through 8.

If you need to cancel any of your requested changes, click **Define** to go back to the LUN/VOL Caching Detail (Logical Device) window.

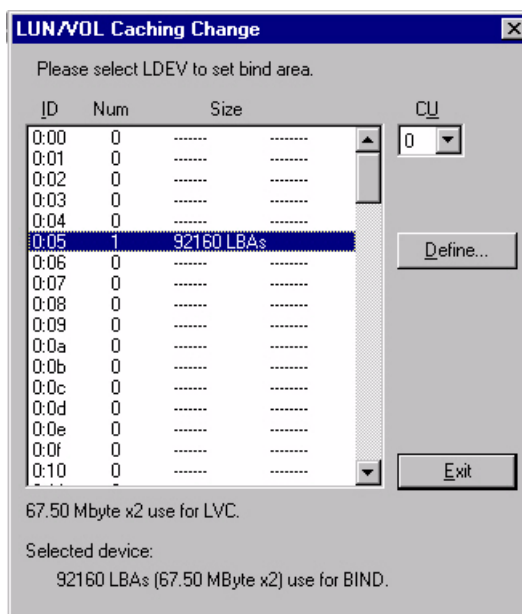
10. When you are finished making changes, click **Exit** to implement the cache changes.

The Option Select window opens.

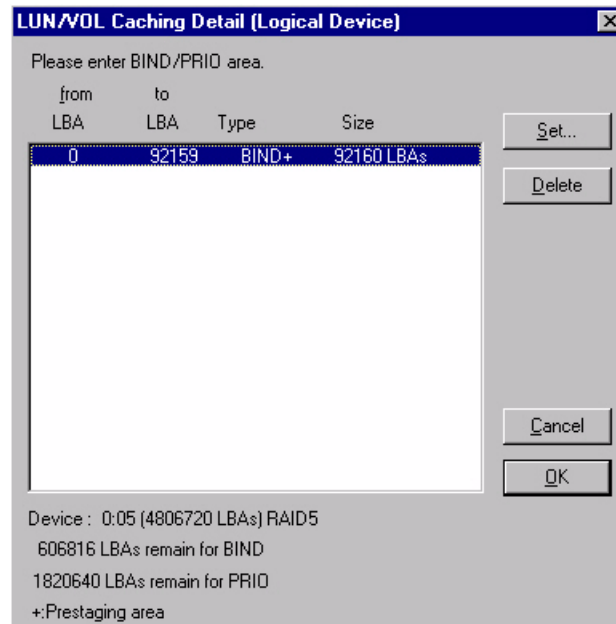
Removing data from cache

The operation to remove data from cache does not complete until you click **Exit** on the LUN/VOL Caching Change window at the end of the procedure.

1. From the LUN/VOL Caching Change window, select the appropriate CU, select the desired LDEV, and click **Define**.



The LUN/VOL Caching Detail (Logical Device) window opens.



2. Select the cache area to be removed and click **Delete**.

If you make a mistake, click **Cancel** to restore the window to its original configuration.

LUN/VOL Caching Detail (Logical Device) [X]

Please enter BIND/PRIOD area.

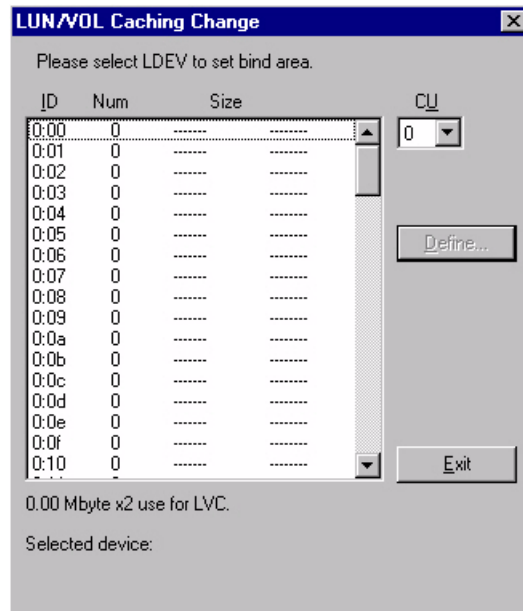
from	to	Type	Size
LBA	LBA		
(No LVC definition)			

[Set...]
[Delete]
[Cancel]
[OK]

Device : 0:05 (4806720 LBAs) RAID5
698976 LBAs remain for BIND
2097120 LBAs remain for PRIOD
+:Prestaging area

3. When the information displayed in the LUN/VOL Caching Detail (Logical Device) window is correct, click **OK** to continue.

The LUN/VOL Caching Change window now displays the changed cache configuration of the selected LDEV.



4. To remove data from cache for another volume, repeat steps 1 through 3.

If you need to cancel any of your requested changes, click **Define** to go back to the LUN/VOL Caching Detail (Logical Device) window.

5. When you are finished making Cache LUN changes, click **Exit** to implement the changes.

The Option Select window opens.

Troubleshooting

You or your HP representative can perform troubleshooting, depending on your HP service contract.

Use the FDCOPY function to copy the Remote Control configuration information onto diskette, and give the diskette(s) to your HP representative when requested. Refer to the Remote Control documentation for instructions about using the FDCOPY function and for more information on troubleshooting.

If you need to call HP customer support, provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the host system. Check the R-SIM window and note the reference codes and severity levels of recent R-SIMs.

Glossary

AL	Arbitrated loop.
AL-PA	Arbitrated loop physical address.
BC	HP StorageWorks Business Copy XP. BC lets you maintain up to nine internal copies of logical volumes on the disk array.
BIND	Bind mode. Bind mode keeps both read and write data in cache, eliminating disk traffic (100% read/write hits). All data stays in cache until the extent is removed.
CA	HP StorageWorks Continuous Access XP. CA lets you create and maintain duplicate copies of logical volumes on a remote disk array.
controller	Controls all data access and storage operations. When organizing the storage space attached to the controller, logical devices (LDEVs) can be associated with control unit (CU) images by grouping similarly configured LDEVs into unique CUs.
CU	Control unit. When organizing the storage space attached to the controller, LDEVs can be associated with CUs by grouping similarly configured LDEVs into unique CUs. The CUs are numbered sequentially.
CV	Custom volume.
DKC (disk controller unit)	The array cabinet that houses the channel adapters and service processor (SVP).
DKU (disk cabinet unit)	The array cabinets that house the physical disks.

emulation modes	<p>The logical devices (LDEVs) in each RAID group can have one of the following emulation modes. The emulation mode determines the capacity of the LDEV.</p> <table> <tr> <td>OPEN-3:</td><td>2.29 GB</td></tr> <tr> <td>OPEN-8:</td><td>6.84 GB</td></tr> <tr> <td>OPEN-9:</td><td>6.88 GB</td></tr> <tr> <td>OPEN-E:</td><td>13.56 GB</td></tr> <tr> <td>OPEN-K:</td><td>1.74 GB</td></tr> <tr> <td>OPEN-L:</td><td>33.94 GB</td></tr> <tr> <td>OPEN-M:</td><td>43.94 GB</td></tr> </table>	OPEN-3:	2.29 GB	OPEN-8:	6.84 GB	OPEN-9:	6.88 GB	OPEN-E:	13.56 GB	OPEN-K:	1.74 GB	OPEN-L:	33.94 GB	OPEN-M:	43.94 GB
OPEN-3:	2.29 GB														
OPEN-8:	6.84 GB														
OPEN-9:	6.88 GB														
OPEN-E:	13.56 GB														
OPEN-K:	1.74 GB														
OPEN-L:	33.94 GB														
OPEN-M:	43.94 GB														
extent	A portion of cache containing a cache LUN volume.														
FV	Fixed volume.														
GB	Gigabytes.														
host mode	Each port can be configured with various host modes. The host mode determines the array's behavior toward a specific host.														
HP	Hewlett-Packard Company.														
H/W	Hardware.														
LBA	Logical block address.														
LDEV	Logical device. An LDEV is created when a RAID group is divided into sections using a host emulation mode (for example, OPEN-9 or OPEN-M). The number of resulting LDEVs depends on the emulation mode. The term LDEV is often used synonymously with the term volume.														
LU	Logical unit.														
LUN	Logical unit number. A LUN results from mapping a SCSI logical unit number, port ID, and LDEV ID to a RAID group. The size of the LUN is determined by the emulation mode of the LDEV, and the number of LDEVs associated with the LUN. For example, a LUN associated with two OPEN-3 LDEVs will have a size of 4,693 MB.														
LUSE	Logical Unit Size Expansion, a feature which logically combines LDEVs so they appear as a larger LDEV. This allows a LUN to be associated with 2 to 36 LDEVs. Essentially, LUSE makes it possible for applications to access data requiring a large amount of disk space.														

MB	Megabytes.
OFC	Open Fibre Control.
OPEN-x	A general term describing any one of the supported OPEN emulation modes (for example, OPEN-3, OPEN-9, OPEN-L, etc.).
OS	Operating system.
PA	Physical address.
path	“Path” and “LUN” are synonymous. Paths are created by associating a port, a target, and a LUN ID with one or more LDEVs.
PC	Personal computer.
port	<p>The number of ports on an XP disk array depends on the number of supported I/O slots and the number of ports available per I/O adapter. The XP family of disk arrays supports Fibre Channel and SCSI ports. <i>I/O support may vary with the selected disk array.</i></p> <p>Ports are named based upon their port group and port letter. Examples of port names include CL1-A through CL1-R and CL2-A through CL2-R (letters I and O are skipped).</p>
P-P	Point-to-point.
PRIO	Priority mode. Priority mode keeps all read data in cache (until you delete the extent) but all writes are destaged to disk normally (using the same algorithms as for regular, non-Cache LUN data).
RAID	Redundant array of independent disks.
RC	HP StorageWorks Remote Control XP. A software product used for managing XP arrays.
remote console PC	The PC running HP StorageWorks Remote Control XP.
R-SIM	Remote service information message.
SCSI	Small computer system interface.
SIM	Service information message.

SNMP	Simple Network Management Protocol.
SVP	Service processor. A laptop PC built into the disk array. The SVP provides a direct interface into the disk array, and is used by the HP service representative only.
TB	Terabytes.
TID	Target ID.
volume	Synonymous with LDEV.
VSC	Volume Size Configuration.

A

- audience
 - intended 3
- authorized reseller, HP 5

C

- conventions
 - documentation 4

D

- data
 - placing 27
 - removing 31
- disk arrays
 - supported 3
- documentation
 - conventions 4
 - related 3

E

- emulation types 10
- extent 10
 - mode description 11

G

- Glossary 37

H

- help
 - obtaining 4
- HP
 - authorized reseller 5
 - storage website 5
 - technical support 5

I

- installation
 - procedure for XP512 19

L

- logical block
 - logical block addresses 13

M

- mode
 - bind description 12
 - priority description 11

O

- operations
 - starting 24

P

- prestaging
 - description 12

R

related documentation

- list of 3

restrictions 14

S

system

- requirements 18

system administrator

- required knowledge 3

T

technical support

- HP 5

U

uninstalling 22

W

websites

- HP storage 5